IN THE CLAIMS

Each claim of the application is set forth below with a parenthetical notation immediately following the claim number indicating the claim status. The Examiner's entry of the claim amendments under Section 1.121 is respectfully requested.

1. (CURRENTLY AMENDED) A method for detecting an end point of a silicon etch process performed in an etch chamber, comprising:

providing a silicon substrate;

forming a stack of one or more material layers over the silicon substrate, wherein an upper layer of the stack comprises an anti-reflective coating layer;

etching a region of the anti-reflective coating layer to form an opening in the region~~therein~~;

etching ~~an upper surface of the anti-reflective coating layer, and~~ the silicon substrate by action of an etchant according to the opening in the anti-reflective coating layer to form a structure in the silicon substrate,; wherein during the step of etching the silicon substrate the anti-reflective coating layer is exposed to the etchant causing etching of the anti-reflective coating layer; and

monitoring an etch chamber environment to determine when the anti-reflective coating layer has been substantially removed by the etchant, wherein the end point is responsive to the monitoring step.

2. (ORIGINAL) The method of claim 1 wherein a material of the anti-reflective coating layer comprises a dielectric.

3. (ORIGINAL) The method of claim 1 wherein a material of the anti-reflective coating layer comprises an organic material.

4. (ORIGINAL) The method of claim 1 wherein a material of the anti-reflective coating layer comprises silicon oxynitride.

5. (ORIGINAL) The method of claim 1 wherein the structure comprises a trench.

6. (ORIGINAL) The method of claim 1 wherein the end point is further responsive to a thickness of the anti-reflective coating layer, a structure depth, and a relationship between a silicon substrate etch rate and an anti-reflective coating layer etch rate.

7. (CURRENTLY AMENDED) The method of claim 6 wherein the step of etching the upper surface and the silicon substrate is extended for an ~~predetermined~~ over-etch interval after the anti-reflective coating layer has been substantially removed, wherein the over-etch interval is responsive to an anti-reflective coating layer thickness, a structure depth, and a difference between the silicon substrate etch rate and the anti-reflective coating layer etch rate.

8. (ORIGINAL) The method of claim 1 wherein an anti-reflective coating layer etch rate may differ from a silicon substrate etch rate during the step of etching the upper surface and the silicon substrate.

9. (ORIGINAL) The method of claim 1 wherein the step of monitoring further comprises monitoring the etch chamber environment to detect a material of the anti-reflective coating layer, and wherein when the material is no longer detected the anti-reflective coating layer has been substantially removed.

10. (ORIGINAL) The method of claim 1 wherein the stack of one or more material layers comprises a silicon dioxide layer, a hard mask layer, the anti-reflective coating layer and a photoresist layer.

11. (ORIGINAL) The method of claim 10 wherein the hard mask layer comprises one of silicon nitride and silicon dioxide.

12. (ORIGINAL) The method of claim 10 wherein the step of etching the anti-reflective coating layer to form an opening therein comprises:

patterning the photoresist layer to form a photoresist opening therein;

etching the silicon dioxide layer, the hard mask layer and the anti-reflective coating layer to form an opening therein according to the photoresist opening; and

removing the photoresist layer.

13. (ORIGINAL) A method for controlling a silicon etch process performed in an etch chamber, comprising:

providing a silicon substrate;

forming a material layer over the silicon substrate;

forming an anti-reflective coating layer over the material layer;

patterning the anti-reflective coating layer and the material layer;

etching a structure in the silicon substrate according to a pattern in the anti-reflective coating layer and the material layer, wherein the anti-reflective coating layer is removed during the etching step;

monitoring an etch chamber environment to detect a material of the material layer; and

controlling the etching step in response to the monitoring step.

14. (ORIGINAL) The method of claim 13 further comprising determining a relationship between a silicon substrate etch rate and an anti-reflective coating layer etch rate, and wherein the step of controlling the etching step is responsive to the relationship and to the monitoring step.

15. (ORIGINAL) The method of claim 14 further comprising determining a thickness of the anti-reflective coating layer and a structure depth.

16. (CURRENTLY AMENDED) The method of claim 15 wherein the step of controlling the etching step further comprises continuing the etching step for an ~~predetermined~~ over-etch interval in response to the thickness of the anti-reflective coating layer, the structure depth, and the relationship between the silicon substrate etch rate and the anti-reflective coating layer etch rate.

17. (ORIGINAL) A method for forming an isolation trench in a silicon substrate, comprising:

providing a silicon substrate;

forming a stack of one or more material layers over the silicon substrate, wherein one layer of the stack comprises an anti-reflective coating material;

patterning the anti-reflective coating material;

etching to form the isolation trench in the silicon substrate according to a pattern in the anti-reflective coating material, wherein the etching step also removes the anti-reflective coating material;

monitoring the etch environment to detect the anti-reflective coating material during the etching step; and

controlling a duration of the etching step in response to the monitoring step to form the isolation trench of a desired depth.

18. (CURRENTLY AMENDED) The method of claim 17 wherein the step of controlling the duration further comprises continuing the etching step for an ~~predetermined~~

over-etch interval in response to a thickness of the anti-reflective coating material, the desired depth, and a relationship between a silicon substrate etch rate and an anti-reflective coating layer etch rate.

19. (CURRENTLY AMENDED) The method of claim 17 wherein the step of controlling the duration further comprises continuing the etching step for an ~~predetermined~~ over-etch interval after the monitoring step does not detect the anti-reflective coating material in the etch environment.

20. (ORIGINAL) The method of claim 19 wherein the over-etch interval is responsive to a relationship between a silicon substrate etch rate and an anti-reflective coating layer etch rate.

21. (ORIGINAL) A method for etching a trench in a semiconductor silicon substrate, wherein the etch process is performed in an etch chamber, the method comprising:

forming a mask layer;

forming an anti-reflective coating layer overlying the mask layer;

patterning the anti-reflective coating layer and the mask layer in accordance with a location for the trench;

etching a trench in the silicon substrate through the patterned anti-reflective coating layer and the patterned mask layer;

monitoring an etch chamber environment to detect removal of the anti-reflective coating layer during the step of etching the trench; and

continuing to etch the trench for an over-etch duration after removal of the anti-reflective coating layer.

22. (ORIGINAL) The method of claim 21 wherein the over-etch duration is responsive to a thickness of the anti-reflective coating material, a trench depth, and a relationship between the silicon substrate etch rate and the anti-reflective coating layer etch rate.